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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,436	11/20/2003	Kaoru Kumagai	1715325	9842

24240 7590 01/22/2007
CHAPMAN AND CUTLER
111 WEST MONROE STREET
CHICAGO, IL 60603

EXAMINER

ALLISON, ANDRAE S

ART UNIT	PAPER NUMBER
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2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/718,436

Applicant(s)

KUMAGAI ET AL.

Examiner

Andrae S. Allison

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 09/30/2004
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima (US Patent No.: 5,589,939) in view of Matsunaga (US Patent No.: 6,826,293).

As to claim 1, Kojima discloses an automatic tracking apparatus for a reflector (laser surveying system, column 1, lines 1-2) comprising: a surveying machine body (see Fig 3); an illumination portion (light projection mechanism unit, see Fig 4) disposed in said surveying machine body for illuminating a measurement light toward a reflector (column 5, lines 14-16); a light receiving portion (e.g. 76, reflecting surfaces, see Fig 6) which disposed in said surveying machine body and which has an image sensor (e.g. 66, light receiving elements, see Fig 5) for receiving a reflection light image of the measurement light illuminated toward said reflector (column 6; lines 7-10 and lines 28-30); arithmetic means (46, CPU, see Fig 3) for calculating a position of the reflection light image from said reflector in an area of said image sensor based on a received light of said image sensor (column 5, lines 11-12); a rotation mechanism (16, rotary unit, see Fig 4) for rotating said surveying machine body so as to position said reflector on a light receiving

optical axis of said light receiving portion based on the position obtained by said arithmetic means (column 5, lines 25-30); a storing portion (45, data recorder, see Fig 3) for storing a quantity of light at each pixel in said image sensor (column 5, lines 10-11). Kojima also teaches an edge position detecting portion for detecting a beginning edge position and an end edge position of said reflection light image at each scanning line in said image sensor (column 6, lines 32-44) however does not mention wherein said arithmetic means calculates the quantity of light at each pixel from said storing portion in accordance with an output of said edge position detecting portion and calculates positions of the weighted average in horizontal and vertical directions of said reflection light image from a horizontal pixel position and a vertical pixel position.

Matsunaga discloses image processing device (column 1, line 11) that includes an edge detection portion (4, see Fig 1) and arithmetic means calculates the quantity of light at each pixel from said storing portion in accordance with an output of said edge position detecting portion and calculates positions of the weighted average in horizontal and vertical directions of said reflection light image from a horizontal pixel position and a vertical pixel position (see column 4, lines 15-20) where the results of the edge detection is used to detect a singular spot which is the weighted average in horizontal and vertical directions of the reflection light image).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have added the image processing device of Matsunaga to the laser surveying system of Kojima to "specify a single point in the Y-Z plane according to the position of the pixel in the distance image, and moreover it is possible to specify a

singular point upon the surface of an object which is present in three dimensional space, since it is possible to specify the position of the X axis direction according to the distance information processed by this pixel" (column 4, lines 57-67).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima (US Patent No.: 5,589,939) in view of Matsunaga (US Patent No.: 6,826,293) further in view of Gotoh (US Patent No.: 6,907,133).

As to claim 3, all the limitation are discussed in claim 1 above except a second storing portion for storing said quantity of received light after binarizing, wherein said arithmetic means detects the position of said reflection light image from the quantity of received light which is stored in said first storing portion and the quantity of received light which is binarized and stored in said second storing portion. Neither Kitajima or Matsunaga disclose a second storing portion for storing said quantity of received light after binarizing, wherein said arithmetic means detects the position of said reflection light image from the quantity of received light which is stored in said first storing portion and the quantity of received light which is binarized and stored in said second storing portion

Gotoh discloses an automatic surveying system (column 1, lines 7-8)) that includes a second storing portion (29, second memory) for storing said quantity of received light after binarizing (column 18, lines 7-9), wherein said arithmetic means detects the position of said reflection light image from the quantity of received light

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which is stored in said first storing portion and the quantity of received light which is binarized and stored in said second storing portion (column 18, lines 10-11).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have substituted the data recorder of Matsunaga with the first and second memory of Gotoh to store the edge position in the first memory and store the edge after binarization in the second memory and use the data stored in the first and second memory to determine the distance or position of an object.

Allowable Subject Matter

Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made part of the record and not relied upon is considered pertinent to applicant's disclosure.

(Kumagai et al (US Patent No.: 6,445,446) is cited to teach a photodetecting system for an automatic surveying instrument.

Kuwamura et al (US Patent No.: 6,559,931) is cited to teach a 3-D coordinate measurement method.

Subbarao et al (US Patent No.: 4,965,840) is cited to teach a method of determining the distance between a surface patch of a 3-D spatial scene and a camera system.

Kochi et al (US Patent No.: 7,010,157) is cited to teach a stereo image-measuring device.

Subbarao et al (US Patent No.: 5,193,124) is cited to teach a method and apparatus for determining the distance of a surface patch of an object from a camera system.

Inquires

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrae S. Allison whose telephone number is (571)

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270-1052. The examiner can normally be reached on Monday-Friday, 8:00 am - 5:00 pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on (571) 272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Andrae Allison

January 16, 2007

A. A.

JINGGE WU
SUPERVISORY PATENT EXAMINER

